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Application Serial No. 10/812,927
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Amendments to the Drawings

The attached drawing sheet includes changes to Figure 1C. Applicant respectfully requests that this drawing, subject to the approval of the Examiner and Official Draftsman, be substituted for the corresponding drawing sheet originally filed in the present application and prior to allowance of the subject application. This attached sheet replaces the original sheet including Figure 1C.

For convenience, a summary of the proposed change is included below:

- a. Figure 1C: Added reference numeral "155" to further illustrate the lateral stop end of the cam groove.
- b. Figure 1C: Added reference numeral "157" to further illustrate the detent portion at the end point of the cam groove.

Attachment: 1 Replacement Sheet

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Page 9**REMARKS**

The Office Action mailed on February 11, 2005, was received and its contents carefully reviewed. By the above Amendment, Applicant amended Figure 1C to further illustrate the lateral stop and detent portion of the cam groove feature. Applicant also amended claims 2, 3, 9, 11, 16, and 17 to further recite features of the lateral stop and detent portion of the cam groove. Additionally, Applicant amended independent claims 1, 15, and 21 to more clearly recite the features and limitations of the present invention. Applicant respectfully submits that no new matter was introduced by these amendments. As now recited, claims 1-25 are currently pending and are believed to be in condition for allowance. Applicant respectfully requests reconsideration of this application in light of the above amendments and the following remarks.

A. Allowable Subject Matter

Applicant appreciates the Examiner's consideration of the previously pending claims and acknowledges the Examiner's objection to claim 10 as being dependent upon a rejected base claim and the Examiner's assertion that claim 10 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

B. Claim Rejections under 35 U.S.C. § 112

Claims 2, 3, 9, 11, 16, 17, and 22 stand rejected under 35 U.S.C. § 112 first paragraph, as containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to make or use the invention. The Examiner asserts that the lateral stop and the detent portion are not shown in the drawings and are not described in such a way as to enable one skilled in the art to make or use the invention. By the above Amendment to the Drawings and to claims 2, 3, 9, 11, 16, and 17, Applicant respectfully submits that the recited features are properly illustrated and supported in such a way as to enable one skilled in the art to make or use the invention.

The Examiner acknowledges that the detent is mentioned in paragraph [0046] on page 10 of the specification. Additionally, the detent portion 157 is shown in the drawings as best illustrated in Figure 1C where the locking portion 159 of the cam grooves 152, 154 comprise

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a larger diameter cut-away that acts as a detent to further secure the cam follower at the far end 155 of travel. The larger diameter cut-away is substantially circular and is located at the far end of travel of locking portion 159 of the cam grooves 152, 154. By the above Amendment, Applicant added additional language related to this optional locking portion detent as well as the lateral stop end of the cam groove. As such, the spatial relationship is now further illustrated with reference numerals and the lateral stop end portion of the cam groove is now more clearly described in the specification. As such, Applicant respectfully submits that claims 2, 3, 9, 11, 16, and 17 now comply with 35 U.S.C. § 112, first paragraph. Applicant respectfully requests reconsideration and that the rejection of claims 2, 3, 9, 11, 16, and 17 under 35 U.S.C. § 112, first paragraph, be withdrawn.

C. Claim Rejections under 35 U.S.C. § 102

1. Rejections under 35 U.S.C. § 102(b) using Bigotto et al. Patent

Claims 1-5, 7-9, 11-13, and 15-19 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Bigotto et al. U.S. Patent No. 6,345,995 (the '995 patent) as indicated beginning on page 3 of the February 11, 2005, Office Action. In view of the amendments above and the comments below, Applicant respectfully requests reconsideration and withdrawal of this rejection.

The present application is generally directed to a lever-type electrical connector assembly that reduces the connection mating forces required to mate female and male connectors. The connector assembly employs a first connector with cam follower projections, a base housing with guide channels, a slide cam housing having substantially parallel interconnected slide cam legs, each including cam grooves and projection guide tracks, and a cover housing pivotally mounted on the base housing, the cover housing having a cover housing projection. The package size of the connector assembly remains substantially the same as the female and male connectors are mated. As the cover housing is rotated from an open to a closed position, it engages the cover housing projection in the projection guide track. This engagement moves the slide cam housing in the guide channel. The slide cam housing moves in the same direction as the cover housing and thereby does not require additional clearance to set the connector package. As the slide cam housing is moved

from an open to a closed position, it engages the cam follower projections in the cam grooves thereby drawing the first connector into the base housing to a connected position.

For example, amended claim 1 recites a lever-type electrical connector assembly that reduces required connecting mating forces comprising a first connector including at least one cam follower projection; a base housing for connecting to the first connector, the base housing including a guide channel; a slide cam housing having substantially parallel interconnected slide cam legs, each including at least one cam groove and a projection guide track, the slide cam housing extending into the guide channel of the base housing; and a cover housing having a cover housing projection engaged in the projection guide track, the cover housing pivotally mounted on the base housing by a fixed pivot point, such that when the cover housing is rotated from an open position to a closed position, the slide cam housing moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing.

The '995 patent fails to teach an interconnected single-piece slide cam housing contained within the guide channel of the base housing as recited in amended claim 1 of the present application. The slide cam housing that extends into the guide channel of the base housing as recited in claim 1 provides a smaller overall connector assembly package and permits access to the connector assembly in smaller confines. In contrast, the '995 patent illustrates a connector assembly with a slide 15 that extends far beyond the geometric bounds of the first connector 2. The unmated package of the connector assembly disclosed in the '995 patent therefore requires additional clearance and does not provide the improved access of the connector assembly recited in amended claim 1.

Additionally, the '995 patent fails to teach a connector assembly comprising a cover housing pivotally mounted on the base housing by a fixed pivot point, such that when the cover housing is rotated from an open position to a closed position, the slide cam housing moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing as also recited in amended claim 1 of the present application. The fixed pivot point recited in amended claim 1 provides a greater mechanical advantage than the combination of movable pins 27, 36, 37 of the '995 patent. The '995 patent

discloses a multiple-stage mating rotation where the movable pins contribute to the rotation of the lever 24 to close the assembly and make the electrical connection. Claim 1 of the present application, in contrast, recites an electrical connector assembly whereby the full range of the cover housing lever is utilized to provide an improved mechanical advantage over the multiple-stage configuration of the '995 patent. Since the pivot point in the present application is further from the locking mechanism, the moment arm is longer and greater force may be transferred from the cover housing lever to the base housing and connector. Therefore, a greater connection force may be generated, or a greater mating force may be overcome by the electrical connector assembly of the present invention.

Likewise, the '995 patent also fails to disclose a slide cam housing that moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing as also recited in amended claim 1 of the present application. As described above, the configuration recited in claim 1 of the present application provides a slide cam housing that extends into the guide channel of the base housing and does not extend beyond the geometric bounds of the base housing as the cover housing is rotated and the electrical connection is secured.

As such, the '995 patent fails to disclose these limitations as recited in amended independent claim 1 of the present application. Accordingly, Applicant respectfully requests reconsideration of claim 1 and withdrawal of the rejection under 35 U.S.C. § 102(b).

Likewise, amended independent claim 15 recites similar features with regard to the slide cam housing having substantially parallel interconnected slide cam legs that extend into the guide channel of the base housing, the fixed pivot point, and the sliding direction as recited in amended independent claim 1. Likewise, the '995 patent fails to disclose these limitations as recited in amended independent claim 15 of the present application. As such, Applicant respectfully requests reconsideration of claim 15 and withdrawal of the rejection under 35 U.S.C. § 102(b).

Dependent claims 2-5, 7-9, 11-13, and 16-19 are dependent upon amended claim 1 and amended claim 15, respectively, and thereby include all the limitations of independent

claims 1 and 15, respectively, while reciting additional features of the present invention. Applicant respectfully traverses the rejection of claims 2-5, 7-9, 11-13, and 16-19 for similar reasons as outlined above with regard to the rejection of claims 1 and 15 under 35 U.S.C. § 102(b). As discussed above, Applicant respectfully submits that the cited reference fails to disclose all the elements and limitations recited in independent claims 1 and 15 of the present application. Therefore, the applied reference fails to disclose all the features and limitations of claims 2-5, 7-9, 11-13, and 16-19 as well.

Accordingly, Applicant respectfully submits that claims 2-5, 7-9, 11-13, and 16-19 are allowable by virtue of their dependency upon claims 1 and 15 as outlined above. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 2-5, 7-9, 11-13, and 16-19 under 35 U.S.C. § 102(b).

2. Additional Rejections under 35 U.S.C. § 102(b)

Claims 1 and 15 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Fink et al. U.S. Patent No. 6,305,957; Ohnuki U.S. Patent No. 6,653,298; Giro U.S. Patent No. 6,641,423; Drescher et al. U.S. Patent No. 6,213,795; Seutschniker et al. U.S. Patent No. 6,168,445; and Sharples et al. U.S. 6,824,406 as indicated on page 4 of the February 11, 2005, Office Action. In view of the amendments above and the comments below, Applicant respectfully requests reconsideration and withdrawal of this rejection.

Applicant respectfully submits that the Fink reference fails to teach a slide cam housing having substantially parallel interconnected slide cam legs, each including at least one cam groove and a projection guide track, the slide cam housing extending into the guide channel of the base housing" as recited in claims 1 and 15 of the present application. Conversely, the Fink reference utilizes a pin slot 54 on the arm 34 that is used in concert with pivot pin 38 (see col. 2, lines 58-60). As the arm 34 in the Fink reference is rotated, the angle of contact between pin slot 54 and pivot pin 38 changes. As the angle of contact changes, the pressure angle also changes. In contrast, claims 1 and 15 of the present application recite a projection guide track on the slide cam. With the configuration recited in claims 1 and 15 of the present application, the contact angle is maintained throughout the rotation process thereby keeping the pressure angle the same and resulting in a larger force transfer than

possible in the configuration of the Fink reference. The Fink reference fails to disclose the slide cam housing recited in claims 1 and 15 of the present application. Since the Fink reference fails to disclose all the elements and limitations recited in amended independent claims 1 and 15 of the present application, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b).

Applicant respectfully submits that the Ohnuki, Giro, Drescher, Seutschniker, and Sharples references fail to teach "a slide cam housing having substantially parallel interconnected slide cam legs, each including at least one cam groove and a projection guide track, the slide cam housing extending into the guide channel of the base housing" as recited in amended claims 1 and 15. Conversely, the listed references utilize a two-piece slide member with which to assist the connection process. However, the single-piece slide cam housing with interconnected slide cam legs as recited in amended claims 1 and 15 of the present invention provides stability to the connector assembly as the connectors are aligned and as the cam action is performed. As described throughout the present specification, connectors that are not properly aligned prior to applying the mating force, or connectors that become misaligned as the mating force is applied, will result in improper mating action and a lack of a suitable transfer of applied force to overcome a mating force. The connector assemblies disclosed by the Ohnuki, Giro, Drescher, Seutschniker, and Sharples references may more easily become misaligned since both sides must simultaneously react to the applied force of the lever arm.

With the configuration recited in claims 1 and 15, the slide cam housing moves as a single unit, and applied forces are maintained throughout the rotation process since any mechanical deflection on one side is negated by the one piece construction. Therefore, applied forces are properly transferred to the cam followers and the connector is drawn together in a fully-aligned fashion. In the configurations disclosed in the above references, (either side of) the slide member may become misaligned during the initial alignment and as the mating force is applied. Additionally, larger mating forces may be utilized in the configuration recited in amended claims 1 and 15 since the force transfer is more efficient with a one-piece construction. The listed references fail to disclose the slide cam housing recited in amended claims 1 and 15 of the present application. Since the listed references fail

to disclose all the elements and limitations recited in amended independent claims 1 and 15 of the present application, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b).

D. Claim Rejections under 35 U.S.C. § 103

Claims 21-24 stand rejected under 35 U.S.C. § 103, as being unpatentable over Bigotto et al. U.S. Patent No. 6,345,995 (the '995 patent) as indicated beginning on page 4 of the Office Action. In view of the amendments above and the comments below, Applicant respectfully requests reconsideration and withdrawal of this rejection.

As the Examiner noted on page 4 of the Office Action, claims 21-24 relate to the method of locking the connector assembly recited in the apparatus claims of the present application. As Applicant indicated above with regard to claims 1-5, 7-9, 11-13, and 15-19, the '995 patent fails to disclose the limitations as recited in amended independent claim 1 of the present application. Likewise, the '995 patent fails to disclose the limitations in the amended independent method claim 21. Specifically, the '995 patent fails to disclose a slide cam housing having substantially parallel interconnected slide cam legs extending into the guide channel of the base housing, a cover housing pivotally mounted on the base housing by a fixed pivot point, such that when the cover housing is rotated from an open position to a closed position, the slide cam housing moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing as recited in amended claim 21 of the present application. Accordingly, Applicant respectfully requests reconsideration of amended claim 21 and withdrawal of the rejection under 35 U.S.C. § 103(a).

Dependent claims 22-24 are dependent upon amended claim 21, and thereby include all the limitations of independent claim 21, while reciting additional features of the present invention. Applicant respectfully traverses the rejection of claims 22-24 for similar reasons as outlined above with regard to the rejection of claims 21 under 35 U.S.C. § 103(a). As discussed above, Applicant respectfully submits that the cited reference fails to disclose all the elements and limitations recited in independent claim 21 of the present application.

Therefore, the applied reference fails to disclose all the features and limitations of claims 22-24 as well.

Accordingly, Applicant respectfully submits that claims 22-24 are allowable by virtue of their dependency upon claim 21 as outlined above. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 22-24 under 35 U.S.C. § 103(a).

Claims 6, 14, 20, and 25 stand rejected under 35 U.S.C. § 103, as being unpatentable over Bigotto et al. U.S. Patent No. 6,345,995 (the '995 patent) in view of Fink et al. U.S. Patent 6,270,376 (the '376 patent). In view of the amendments above and the comments below, Applicant respectfully requests reconsideration and withdrawal of this rejection.

Claim 6 and claim 14 are dependent upon amended claim 1, while claim 20 depends upon amended independent claim 15, and claim 25 depends upon amended independent claim 21.

As Applicant indicated above with regard to claims 1, 15, and 21, the '995 patent fails to disclose the limitations as recited in these amended independent claims. Specifically, the '995 patent fails to disclose a single-piece slide cam housing having substantially parallel interconnected slide cam legs extending into the guide channel of the base housing, a cover housing pivotally mounted on the base housing by a fixed pivot point, such that when the cover housing is rotated from an open position to a closed position, the slide cam housing moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing as recited in the amended independent claims 1, 15, and 21 of the present application.

While the '376 patent appears to disclose a cable seal 28, the '376 patent fails to cure the deficiencies of the '995 patent as to the above limitations recited in independent claims 1, 15, and 21. The '376 patent fails to disclose a slide cam housing having substantially parallel interconnected slide cam legs, such that when the cover housing is rotated from an open position to a closed position, the slide cam housing moves laterally along the width of the connector assembly in the same direction as the rotation of the cover housing as recited in the amended independent claims 1, 15, and 21 of the present application.


For these reasons, the Examiner fails to establish a *prima facie* case of obviousness under 35 U.S.C. § 103. Accordingly, Applicant respectfully submits that claims 6, 14, 20, and 25 are allowable by virtue of their dependency upon claims 1, 15, and 21, respectively, as outlined above. Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 6, 14, 20, and 25 under 35 U.S.C. § 103(a).

E. Conclusion

In view of the above amendments and remarks, Applicant respectfully requests the Examiner's reconsideration of this application and the timely allowance of the pending claims.

Respectfully submitted,

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